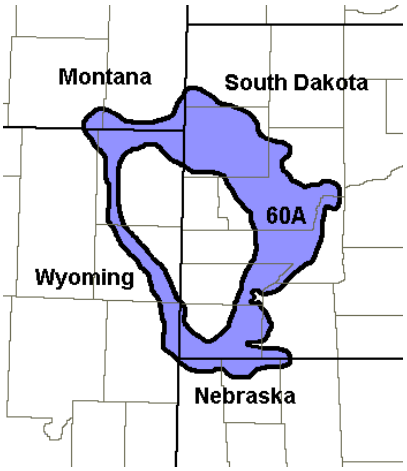
United States Department of Agriculture
Natural Resources Conservation Service

Ecological Site Description



Site Type: Rangeland

Site Name: Thin Claypan

Site ID: R060AY015SD

Major Land Resource Area: 60A – Pierre Shale Plains

Physiographic Features

This site occurs on nearly level to gently undulating or rolling uplands.

Landform: alluvial fan, alluvial flat, hill, plain

Aspect: N/A

	Minimum	Maximum
Elevation (feet):	2500	4300
Slope (percent):	0	15
Water Table Depth (inches):	48	80
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	High

Climatic Features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland steppes to the east. Annual precipitation ranges from 13 to 18 inches per year, with most occurring during the growing season. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 46° F. January is the coldest month with average temperatures ranging from about 19° F (Moorcroft CAA, WY) to about 22° F (Belle Fourche, SD). July is the warmest month with temperatures averaging from about 70° F (Moorcroft CAA, WY) to about 72° F (Belle Fourche, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 51° F. Hourly winds are estimated to average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of cool season plants begins in early to mid March, slowing or ceasing in late June. Warm season plants begin growth about mid May and can continue to early or mid September. Green up of cool season plants may occur in September and October when adequate soil moisture is present.

	Minimum	Maximum
Frost-free period (days):	122	129
Freeze-free period (days):	145	152
Mean Annual Precipitation (inches):	13	18

Average Monthly Precipitation (inches) and Temperature (ºF):

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.32	0.43	7.1	34.1
February	0.44	0.57	12.6	40.1
March	0.65	0.94	19.7	46.5
April	1.43	1.72	29.4	60.2
May	2.45	3.19	39.7	70.6
June	2.34	3.38	48.5	80.1
July	1.60	2.78	54.8	88.0
August	1.24	1.76	53.1	87.7
September	1.01	1.50	42.3	77.0
October	0.90	1.11	31.4	64.9
November	0.40	0.61	19.8	47.5
December	0.40	0.48	10.2	38.0

Climate Stations		Period	
Station ID	**Location or Name**	**From**	**To**
SD0236	Ardmore 2 N	1948	1999
SD0559	Belle Fourche	1948	1999
SD1124	Buffalo Gap	1951	1999
WY6395	Moorcroft CAA	1948	1998
WY9207	Upton 13 SW	1949	1998

For other climate stations that may be more representative, refer to http://www.wcc.nrcs.usda.gov.

Influencing Water Features

No significant water features influence this site.

Representative Soil Features

The soils in this site are moderately well to well drained and formed in soft sandstone, siltstones, shales and alluvium. The fine sandy loam to clay loam surface layer is 1 to 5 inches thick. The extremely hard clayey Btn horizon has round-topped or “bun shaped” columnar or prismatic structure. These Btn horizons are high in sodium. The soils have a moderate to slow infiltration rate and very slow saturated hydraulic conductivity. Wet surface compaction can occur with heavy traffic. This site should show slight to no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 9 percent. More information can be found in the various soil survey reports. Contact the local USDA Service Center for soil survey reports that include more detail specific to your location.

Parent Material Kind: alluvium and residuum
Parent Material Origin: sandstone, shale
Surface Texture: silt loam, loam, fine sandy loam
Surface Texture Modifier: none
Subsurface Texture Group: clayey
Surface Fragments ≤ 3" (% Cover): 0
Surface Fragments > 3" (%Cover): 0
Subsurface Fragments ≤ 3" (% Volume): 0-20
Subsurface Fragments > 3" (% Volume): 0-10

	Minimum	Maximum
Drainage Class:	moderately well	well
Permeability Class:	very slow	slow
Depth (inches):	6	20
Electrical Conductivity (mmhos/cm)*:	0	16
Sodium Absorption Ratio*:	13	50
Soil Reaction (1:1 Water)*:	5.1	9.5
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	1	3
Calcium Carbonate Equivalent (percent)*:	0	10

* - These attributes represent from 0-40 inches or to the first restrictive layer.

Plant Communities

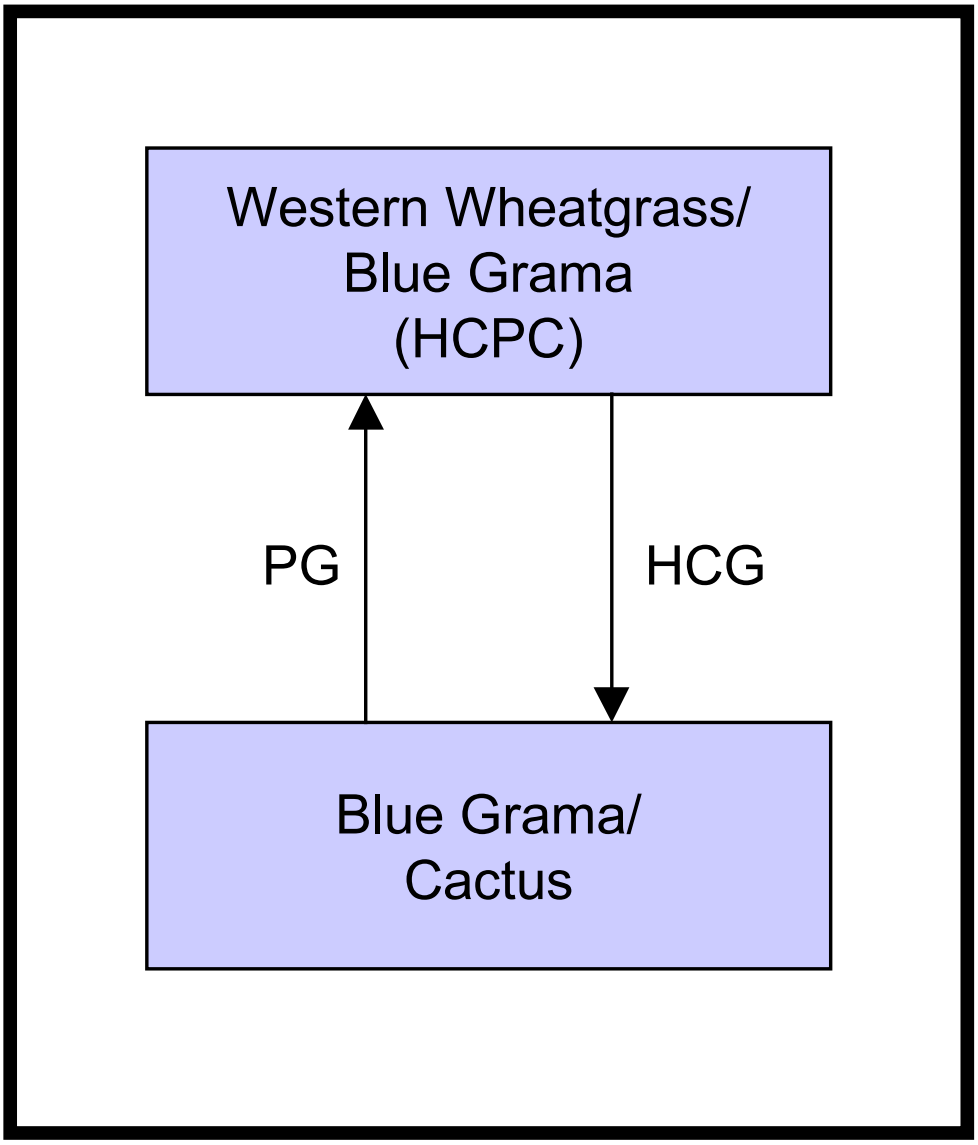
Ecological Dynamics of the Site:
This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions describe more typical transitions between communities that will occur, severe disturbances, such as periods of well-below average precipitation, can cause significant shifts in plant communities and/or species composition.

Shrubs such as big sagebrush, saltbush, greasewood, winterfat and silver sagebrush occur more frequently on the western portion of this MLRA. In areas where the shrubs are more prevalent, they can comprise as much as 20-30% of the plant community. In association with this site are also areas of slick spots that usually have considerably more bare ground, and are typically dominated by cactus. Slick spots are bare ground areas that are affected by high sodium concentrations. The soil factors are the dominant influence and grazing management is not necessarily the primary influence of these areas. These areas can occur as a complex with this site, sometimes being difficult to differentiate between the two.

The plant community upon which the interpretations are primarily based is the Historic Climax Plant Community (HCPC). The HCPC has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following diagram illustrates the common plant communities and vegetation states commonly occurring on the site and the transition pathways between communities and states. The ecological processes are discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



HCPC - Historic Climax Plant Community;
HCG - heavy continuous grazing;
PG - prescribed grazing.

Plant Community Composition and Group Annual Production

			Western Wheatgrass/Blue Grama (HCPC)		
COMMON/GROUP NAME	**SCIENTIFIC NAME**	**SYMBOL**	**Group**	**lbs./acre**	**% Comp**
GRASSES & GRASS-LIKES				*675 - 810*	*75 - 90*
RHIZOMATOUS WHEATGRASSES			**1**	**180 - 360**	**20 - 40**
western wheatgrass	Pascopyrum smithii	PASM	1	180 - 360	20 - 40
Montana wheatgrass	Elymus albicans	ELAL7	1	0 - 90	0 - 10
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	0 - 90	0 - 10
SHORT WARM-SEASON GRASSES			**2**	**135 - 225**	**15 - 25**
blue grama	Bouteloua gracilis	BOGR2	2	135 - 225	15 - 25
buffalograss	Buchloe dactyloides	BUDA	2	0 - 45	0 - 5
COOL-SEASON GRASSES			**3**	**45 - 180**	**5 - 20**
green needlegrass	Nassella viridula	NAVI4	3	9 - 90	1 - 10
needleandthread	Hesperostipa comata ssp. comata	HECOC8	3	9 - 90	1 - 10
Sandberg bluegrass	Poa secunda	POSE	3	9 - 45	1 - 5
prairie junegrass	Koeleria macrantha	KOMA	3	9 - 45	1 - 5
OTHER NATIVE GRASSES			**4**	**18 - 45**	**2 - 5**
plains reedgrass	Calamagrostis montanensis	CAMO	4	0 - 9	0 - 1
inland saltgrass	Distichlis spicata	DISP	4	0 - 27	0 - 3
tumblegrass	Schedonnardus paniculatus	SCPA	4	0 - 18	0 - 2
sand dropseed	Sporobolus cryptandrus	SPCR	4	0 - 18	0 - 2
prairie sandreed	Calamovilfa longifolia	CALO	4	0 - 18	0 - 2
little bluestem	Schizachyrium scoparium	SCSC	4	0 - 45	0 - 5
other perennial grasses		2GP	4	9 - 45	1 - 5
other annual grasses		2GA	4	0 - 9	0 - 1
GRASS-LIKES			**5**	**18 - 90**	**2 - 10**
needleleaf sedge	Carex duriuscula	CADU6	5	9 - 72	1 - 8
threadleaf sedge	Carex filifolia	CAFI	5	9 - 72	1 - 8
other grass-likes		2GL	5	0 - 45	0 - 5
FORBS			*7*	*45 - 90*	*5 - 10*
cudweed sagewort	Artemisia ludoviciana	ARLU	7	0 - 9	0 - 1
heath aster	Symphyotrichum ericoides	SYER	7	0 - 18	0 - 2
Lambert crazyweed	Oxytropis lambertii	OXLA3	7	0 - 18	0 - 2
Nuttall's violet	Viola nuttallii	VINU2	7	0 - 9	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	7	9 - 18	1 - 2
rose pussytoes	Antennaria rosea	ANRO2	7	0 - 9	0 - 1
rush skeletonweed	Lygodesmia juncea	LYJU	7	0 - 9	0 - 1
scarlet globemallow	Sphaeralcea coccinea	SPCO	7	9 - 9	1 - 1
silverleaf scurfpea	Pediomelum argophyllum	PEAR6	7	0 - 18	0 - 2
spiny phlox	Phlox hoodii	PHHO	7	9 - 9	1 - 1
sticky cinquefoil	Potentilla glandulosa	POGL9	7	0 - 9	0 - 1
wavyleaf thistle	Cirsium undulatum	CIUN	7	0 - 9	0 - 1
western yarrow	Achillea millefolium	ACMI2	7	9 - 18	1 - 2
wild onion	Allium spp.	ALLIU	7	9 - 9	1 - 1
wild parsley	Musineon divaricatum	MUDI	7	0 - 9	0 - 1
woolly Indianwheat	Plantago patagonica	PLPA2	7	0 - 9	0 - 1
other perennial forbs		2FP	7	0 - 18	0 - 2
other annual forbs		2FA	7	0 - 18	0 - 2
SHRUBS			*8*	*45 - 135*	*5 - 15*
big sagebrush	Artemisia tridentata	ARTR2	8	0 - 90	0 - 10
black greasewood	Sarcobatus vermiculatus	SAVE4	8	0 - 45	0 - 5
brittle cactus	Opuntia fragilis	OPFR	8	9 - 18	1 - 2
fringed sagewort	Artemisia frigida	ARFR4	8	9 - 27	1 - 3
plains pricklypear	Opuntia polyacantha	OPPO	8	0 - 27	0 - 3
rubber rabbitbrush	Ericameria nauseosa	ERNA10	8	0 - 9	0 - 1
saltbush	Atriplex spp.	ATRIP	8	9 - 45	1 - 5
silver sagebrush	Artemisia cana	ARCA13	8	0 - 27	0 - 3
winterfat	Krascheninnikovia lanata	KRLA2	8	0 - 45	0 - 5
other shrubs		2SHRUB	8	0 - 18	0 - 2
CRYPTOGAMS			*9*	*0 - 9*	*0 - 1*
clubmoss	Selaginella densa	SEDE2	9	0 - 9	0 - 1

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	420 -	738	- 955
FORBS	40 -	68	- 95
SHRUBS	40 -	90	- 140
CRYPTOGAMS	0 -	5	- 10
TOTAL	500 -	900	- 1200

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

Plant Community Composition and Group Annual Production

		Western Wheatgrass/ Blue Grama (HCPC)			Blue Grama/Cactus		
COMMON/GROUP NAME	SYMBOL	Group	lbs./acre	% Comp	Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES			*675 - 810*	*75 - 90*		*225 - 375*	*45 - 75*
RHIZOMATOUS WHEATGRASSES		**1**	**180 - 360**	**20 - 40**	**1**	**25 - 75**	**5 - 15**
western wheatgrass	PASM	1	180 - 360	20 - 40	1	0 - 50	0 - 10
Montana wheatgrass	ELAL7	1	0 - 90	0 - 10	1	0 - 50	0 - 10
thickspike wheatgrass	ELLAL	1	0 - 90	0 - 10			
SHORT WARM-SEASON GRASSES		**2**	**135 - 225**	**15 - 25**	**2**	**125 - 200**	**25 - 40**
blue grama	BOGR2	2	135 - 225	15 - 25	2	125 - 200	25 - 40
buffalograss	BUDA	2	0 - 45	0 - 5	2	0 - 25	0 - 5
COOL-SEASON GRASSES		**3**	**45 - 180**	**5 - 20**	**3**	**25 - 50**	**5 - 10**
green needlegrass	NAVI4	3	9 - 90	1 - 10	3	0 - 10	0 - 2
needleandthread	HECOC8	3	9 - 90	1 - 10	3	0 - 50	0 - 10
Sandberg bluegrass	POSE	3	9 - 45	1 - 5	3	0 - 25	0 - 5
prairie junegrass	KOMA	3	9 - 45	1 - 5	3	5 - 50	1 - 10
OTHER NATIVE GRASSES		**4**	**18 - 45**	**2 - 5**	**4**	**25 - 75**	**5 - 15**
plains reedgrass	CAMO	4	0 - 9	0 - 1			
inland saltgrass	DISP	4	0 - 27	0 - 3	4	0 - 50	0 - 10
tumblegrass	SCPA	4	0 - 18	0 - 2	4	0 - 25	0 - 5
sand dropseed	SPCR	4	0 - 18	0 - 2	4	0 - 25	0 - 5
prairie sandreed	CALO	4	0 - 18	0 - 2			
little bluestem	SCSC	4	0 - 45	0 - 5	4	0 - 5	0 - 1
threeawn	ARIST				4	0 - 25	0 - 5
other perennial grasses	2GP	4	9 - 45	1 - 5	4	0 - 25	0 - 5
other annual grasses	2GA	4	0 - 9	0 - 1	4	0 - 25	0 - 5
GRASS-LIKES		**5**	**18 - 90**	**2 - 10**	**5**	**10 - 50**	**2 - 10**
needleleaf sedge	CADU6	5	9 - 72	1 - 8	5	0 - 25	0 - 5
threadleaf sedge	CAFI	5	9 - 72	1 - 8	5	5 - 50	1 - 10
other grass-likes	2GL	5	0 - 45	0 - 5	5	0 - 25	0 - 5
NON-NATIVE GRASSES		**6**			**6**	**5 - 25**	**1 - 5**
cheatgrass	BRTE				6	5 - 25	1 - 5
FORBS		*7*	*45 - 90*	*5 - 10*	*7*	*25 - 50*	*5 - 10*
cudweed sagewort	ARLU	7	0 - 9	0 - 1	7	0 - 15	0 - 3
curlycup gumweed	GRSQ				7	0 - 15	0 - 3
heath aster	SYER	7	9 - 18	1 - 2	7	0 - 15	0 - 3
Lambert crazyweed	OXLA3	7	9 - 18	1 - 2	7	0 - 10	0 - 2
Nuttall's violet	VINU2	7	0 - 9	0 - 1	7	0 - 10	0 - 2
prairie coneflower	RACO3	7	9 - 18	1 - 2	7	0 - 10	0 - 2
rose pussytoes	ANRO2	7	9 - 9	1 - 1	7	0 - 10	0 - 2
rush skeletonweed	LYJU	7	9 - 9	1 - 1	7	5 - 15	1 - 3
scarlet globemallow	SPCO	7	9 - 9	1 - 1	7	5 - 15	1 - 3
silverleaf scurfpea	PEAR6	7	9 - 18	1 - 2	7	0 - 10	0 - 2
spiny phlox	PHHO	7	0 - 9	0 - 1	7	0 - 10	0 - 2
sticky cinquefoil	POGL9	7	9 - 9	1 - 1	7	0 - 10	0 - 2
sweetclover	MELIL				7	0 - 25	0 - 5
wavyleaf thistle	CIUN	7	0 - 9	0 - 1	7	0 - 10	0 - 2
western salsify	TRDU				7	0 - 15	0 - 3
western yarrow	ACMI2	7	9 - 18	1 - 2	7	5 - 15	1 - 3
wild onion	ALLIU	7	9 - 9	1 - 1	7	0 - 10	0 - 2
wild parsley	MUDI	7	9 - 9	1 - 1	7	0 - 10	0 - 2
woolly Indianwheat	PLPA2	7	0 - 9	0 - 1	7	0 - 15	0 - 3
other perennial forbs	2FP	7	0 - 18	0 - 2	7	0 - 10	0 - 2
other annual forbs	2FA	7	0 - 18	0 - 2	7	0 - 10	0 - 2
SHRUBS		*8*	*45 - 135*	*5 - 15*	*8*	*75 - 225*	*15 - 45*
big sagebrush	ARTR2	8	0 - 90	0 - 10	8	0 - 75	0 - 15
black greasewood	SAVE4	8	0 - 45	0 - 5			
brittle cactus	OPFR	8	9 - 18	1 - 2	8	5 - 35	1 - 7
broom snakeweed	GUSA2				8	0 - 35	0 - 7
fringed sagewort	ARFR4	8	9 - 27	1 - 3	8	15 - 35	3 - 7
plains pricklypear	OPPO	8	0 - 27	0 - 3	8	50 - 150	10 - 30
rubber rabbitbrush	ERNA10	8	0 - 9	0 - 1	8	0 - 5	0 - 1
saltbush	ATRIP	8	9 - 45	1 - 5	8	0 - 5	0 - 1
silver sagebrush	ARCA13	8	0 - 27	0 - 3	8	0 - 50	0 - 10
winterfat	KRLA2	8	0 - 45	0 - 5			
other shrubs	2SHRUB	8	0 - 18	0 - 2	8	0 - 25	0 - 5
CRYPTOGAMS		*9*	*0 - 9*	*0 - 1*	*9*	*0 - 10*	*0 - 2*
clubmoss	SEDE2	9	0 - 9	0 - 1	9	0 - 10	0 - 2

Annual Production lbs./acre	LOW	RV	HIGH	LOW	RV	HIGH
GRASSES & GRASS-LIKES	420 -	738	-955	210 -	308	-600
FORBS	40 -	68	-95	20 -	38	-55
SHRUBS	40 -	90	-140	70 -	150	-230
CRYPTOGAMS	0 -	5	-10	0 -	5	-15
TOTAL	500 -	900	-1200	300 -	500	-900

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value.

Plant Community and Vegetation State Narratives

Following are the narratives for each of the described plant communities. These plant communities may not represent every possibility, but they are the most prevalent and repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more information is collected, some of these plant community descriptions may be revised or removed, and new ones added. None of these plant communities should necessarily be thought of as "Desired Plant Communities". According to the USDA NRCS National Range and Pasture Handbook, Desired Plant Communities (DPC's) will be determined by the decision makers and will meet minimum quality criteria established by the NRCS. The main purpose for including any description of a plant community here is to capture the current knowledge and experience at the time of this revision.

Western Wheatgrass/Blue Grama Plant Community

The plant community upon which interpretations are primarily based is the Western Wheatgrass/Blue Grama Plant Community. This is also considered to be the Historic Climax Plant Community (HCPC). This plant community can be found on areas having a history of proper grazing management, including adequate recovery periods between grazing events. The potential vegetation is about 75-90% grasses or grass-like plants, 5-10% forbs and 5-15% shrubs. The rhizomatous wheatgrasses dominate the plant community, while blue grama is also prevalent. Other grasses and grass-like plants occurring on the site include green needlegrass, needleandthread, buffalograss, Sandberg bluegrass and sedges. Significant forbs include scarlet globemallow, cudweed sagewort and heath aster. Shrubs occurring in this plant community include cactus, big sagebrush, saltbush and fringed sagewort.

This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle and energy flow are functioning at the sites potential. Plant litter is properly distributed with some movement off-site and natural plant mortality is low. Low to moderate available water capacity coupled with high accumulations of sodium and slow permeability strongly influences the soil-water-plant relationships.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:
Growth curve number: SD6002
Growth curve name: Pierre Shale Plains, cool-season dominant, warm-season sub-dominant.
Growth curve description: Cool-season dominant, warm-season sub-dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	3	10	23	34	15	6	5	4	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Heavy, continuous grazing will convert the plant community to the *Blue Grama/Cactus Plant Community*.

Blue Grama/Cactus Plant Community

This plant community can develop from the adverse effects of heavy continuous grazing and/or annual, spring seasonal grazing. Short grasses and cactus increase to dominate the site and annual production decreases dramatically. Lack of litter and short plant heights result in higher soil temperatures, poor water infiltration rates, and high evaporation, which gives blue grama a competitive advantage over cool season mid-grasses. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur.

Blue grama and cactus are the dominant species. Other grasses and grass-likes occurring include western wheatgrass, sedge, buffalograss, inland saltgrass, needleandthread, prairie junegrass, and annual grasses. Forbs such as brome snakeweed, cudweed sagewort, heath aster and western yarrow may also be present. Some non-native species will begin to invade this plant community including salsify, sweetclover and annual bromes. There is usually more than 25% bare ground.

This plant community is quite resilient. The thick sod and competitive advantage prevents other species from establishing. This plant community is less productive than the HCPC. Runoff increases and infiltration will decrease. Soil erosion will be minimal due to the sod forming habit of blue grama.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during an average year:
Growth curve number: SD6005
Growth curve name: Pierre Shale Plains, warm-season dominant.
Growth curve description: Warm-season dominant.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0	2	5	15	25	30	15	7	1	0	0

Transitional pathways and/or community pathways leading to other plant communities are as follows:

- Prescribed grazing can shift this plant community back to the *Western Wheatgrass/Blue Grama Plant Community*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Western Wheatgrass/Blue Grama Plant Community:

Blue Grama/Cactus Plant Community:

Animal Preferences (Quarterly – 1,2,3,4†)

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-likes							
blue grama	U D P D	D P P D	U D P U	D P P D	D P P D	U D P U	U D P U
buffalograss	U U P D	U U P D	U U D U	N U D U	N U D U	U U D U	U U D U
green needlegrass	U P U D	N P N P	U P U D	N P N P	N P N P	U P U D	U P U D
inland saltgrass	N U U N	N N N N	N U U N	N N N N	N N N N	N U U N	N U U N
little bluestem	U D D U	U U D U	U D D U	N D N N	N D N N	U D D U	U D D U
Montana wheatgrass	U P D U	N D N N	U P D U	N D N N	N D N N	U P D U	U P D U
needleandthread	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
needleleaf sedge	U P U D	U P U D	U D U D	U D U D	U D U D	U D U D	U D U D
plains reedgrass	U D U U	N D N N	U D U U	N D N N	N D N N	U D U U	U D U U
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
prairie sandreed	U D D U	U D U U	U D D U	U U D U	U U D U	U D D U	U D D U
sand dropseed	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
Sandberg bluegrass	U U U U	U D U U	N U N N	N D N N	N D N N	N U N N	N U N N
thickspike wheatgrass	U D D U	U D U U	U D D U	N D N N	N D N N	U D D U	U D D U
threadleaf sedge	U P U D	U P U D	U D U D	U D U D	U D U D	U D U D	U D U D
tumblegrass	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
western wheatgrass	U P D D	U D U U	U P D U	N D N N	N D N N	U P D U	U P D U
Forbs							
cudweed sagewort	U U U U	U U D U	U U U U	U U D U	U U D U	U U U U	U U D U
heath aster	U U D U	U U P U	U U D U	U U P U	U U P U	U U D U	U U P U
Lambert crazyweed	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T	T T T T
Nuttall's violet	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N	N U N N
prairie coneflower	U U D U	U P P U	U U D U	U P P U	U P P U	U U D U	U P P U
rose pussytoes	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U	U U U U
rush skeletonweed	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
scarlet globemallow	U U D U	U D D U	U U D U	U D D U	U D D U	U U D U	U D D U
silverleaf scurfpea	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
spiny phlox	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
sticky cinquefoil	N N N N	N U D N	N N N N	N U D N	N U D N	N N N N	N U D N
wavyleaf thistle	U U U U	N N N N	U U U U	N N N N	N N N N	U U U U	N N N N
western yarrow	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
wild onion	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
wild parsley	U D U U	U D D U	U D U U	U D D U	U D D U	U D U U	U D D U
woolly Indianwheat	U U U U	N U U N	U U U U	N U U N	N U U N	U U U U	N U U N
Shrubs							
big sagebrush	U U U U	D U U D	U N U U	P U D P	P P P P	U N U U	D U U U
black greasewood	U D D U	T T T T	U D D U	D U U D	D U U D	U D D U	D U U U
brittle cactus	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
fringed sagewort	U U U U	U U U U	U U U U	U D D U	U P P D	U U U U	U U U D
plains pricklypear	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N
rubber rabbitbrush	N N N N	D U U D	N N N N	D U U D	U P P U	N N N N	D U U U
saltbush	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P	P D D P
silver sagebrush	D U U D	D U U D	D U U D	P D D P	P P P P	D U U D	D U U D
winterfat	P P P P	P P P P	P P P P	P P P P	P P P P	P P P P	P P P P
Cryptogams							
clubmoss	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N	N N N N

N = not used; **U** = undesirable; **D** = desirable; **P** = preferred; **T** = toxic
† Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

The following table lists annual, suggested initial stocking rates with average growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of conservation planning. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this a resource inventory is necessary to document plant composition and production. More accurate carrying capacity estimates should eventually be calculated using the following stocking rate information along with animal preference data and actual stocking records, particularly when grazers other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Plant Community	Average Annual Production (lbs./acre, air-dry)	Stocking Rate* (AUM/acre)
Western Wheatgrass/Blue Grama (HCPC)	900	0.28
Blue Grama/Cactus	500	0.15

* Based on 790 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25% harvest efficiency (refer to USDA NRCS, National Range and Pasture Handbook).

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

Hydrology Functions

Water is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic group D. Infiltration varies from moderate to very slow and runoff potential varies from medium to very high depending on slope and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where a dense sod of short grasses dominates the site. Normally areas where ground cover is less than 50% have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting opportunities for upland game species. The wide varieties of plants, which bloom from spring until fall, have an esthetic value that appeals to visitors.

Wood Products

Other Products

Seed harvest of native plant species can provide additional income on this site.

Supporting Information

Associated Sites

(060AY011SD) – Clayey 13-16” P.Z.
(060AY040SD) – Clayey 16-18” P.Z.
(060AY013SD) – Claypan
(060AY018SD) – Dense Clay

Similar Sites

(060AY011SD & 060AY040SD) – Clayey 13-16" P.Z. & Clayey 16-18" P.Z.
[more green needlegrass; higher production]
(060AY013SD) – Claypan
[more production; more western wheatgrass and green needlegrass]

Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel was also used. Those involved in developing this site description include: Stan Boltz, Range Management Specialist, NRCS; Cheryl Nielsen, Range Management Specialist, NRCS; Rick Peterson, Range Management Specialist, NRCS; Mike Stirling, Range Management Specialist, NRCS.

Data Source	Number of Records	Sample Period	State	County
SCS-RANGE-417				

State Correlation

This site has been correlated between Montana, Nebraska, South Dakota & Wyoming in MLRA 60A.

Field Offices

Belle Fourche, SD	Custer, SD	Hot Springs, SD	Pine Ridge, SD	Sundance, WY
Broadus, MT	Ekalaka, MT	Lusk, WY	Rapid City, SD	Wall, SD
Buffalo, SD	Faith, SD	Martin, SD	Rushville, NE	
Chadron, NE	Gillette, WY	Newcastle, WY	Sturgis, SD	

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43e – Sagebrush Steppe, 43g – Semiarid Pierre Shale Plains, and 43k – Dense Clay Prairie.

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (http://hpccsun.unl.edu)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (http://wcc.nrcs.usda.gov)

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (http://nasis.nrcs.usda.gov)

USDA, NRCS, 2002. National Soil Survey Handbook, title 430-VI. (http://soils.usda.gov/procedures/handbook/main.htm)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, NRCS, Various Published Soil Surveys.

Site Description Approval

MT, State Range Management Specialist	Date	NE, State Range Management Specialist	Date
SD, State Range Management Specialist	Date	WY, State Range Management Specialist	Date